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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* HANNA E. WITZGALL

Appeal 2008-2475  
Application 09/469,070  
Technology Center 2600

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Decided: January 9, 2009

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Before MAHSHID D. SAADAT, JOHN A. JEFFERY,  
and KARL D. EASTHOM, *Administrative Patent Judges*.

EASTHOM, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant appeals under 35 U.S.C. § 134 from the Examiner's Final Rejection of claims 7-9 and 11-13. (Br. 2).<sup>1</sup> We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

Appellant claims a color modulator having alternating layers of dielectric materials and electrodes. Voltages applied to the electrodes alter a refractive index of the dielectric materials to filter an incident white light beam into one of at least three colors. (Spec. 3: 7-10; 10: 12-19; 12: 8-16).

Claim 7, illustrative of the invention, follows:

7. A color modulator comprising:

a substrate; and

alternating layers of electrodes and dielectric materials, wherein voltages applied to said electrodes are operable to alter a refractive index of said dielectric material between said electrodes to filter an incident white light beam into a light beam of at least one of at least three colors.

The Examiner relies on the following prior art references to show unpatentability:

Mochizuki Taketo <sup>2</sup>	US 5,317,429 JP 10-221710 A	May 31, 1994 Aug. 21, 1998
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<sup>1</sup> The Examiner's Answer (mailed May 3, 2007) ("Ans.") and Appellant's Brief (filed December 27, 2006) ("Br.") detail the parties' positions.

<sup>2</sup> Hereinafter, "Taketo" refers to the English translation (sent to Appellant electronically on January 28, 2008) of this Japanese published patent application (despite the designation of the inventors as "SHIGERU YAMAMOTO ET AL" on the title page, and page 2, of the translation).

The Examiner rejected claims 7, 9 and 11 under 35 U.S.C. § 103(a) based upon the teachings of Taketo.

The Examiner rejected claims 8, 12 and 13 under 35 U.S.C. § 103(a) based upon the teachings of Taketo and Mochizuki.

## ISSUES

Appellant generally contends that Taketo fails to teach or suggest “wherein voltages applied to said electrodes are operable to alter a refractive index of said dielectric material between said electrodes,” as set forth in claim 7. (Br. 5-6). Appellant also contends that the combination of Taketo and Mochizuki fails to teach a dielectric material of LiNbO<sub>3</sub> as set forth in claim 12. (Br. 6-8). Appellant makes no separate patentability arguments with respect to the remaining claims. (See Br. 8). Accordingly, we select independent claims 7 and 12 as representative of the claims on appeal.

The issues before us are:

Does Taketo teach “wherein voltages applied to said electrodes are operable to alter a refractive index of said dielectric material between said electrodes,” as set forth in claim 1?

Do Taketo and Mochizuki collectively teach the dielectric material, LiNbO<sub>3</sub>, recited in claim 12?

## FINDINGS OF FACT (FF)

1. Taketo discloses at least three prior art examples of alternating layers of dielectric layers and electrodes wherein a voltage alters the refractive index of the dielectric layers, composed of liquid crystal, to filter

incident light into three colors, red, green and blue. (Taketo; Figs. 5-8; ¶¶0015-0017, 0036; *see generally* ¶¶0023-0043). Nematic liquid crystals having a positive dielectric anisotropy, or liquid crystals generally, form the dielectric layers of the embodiments, and each embodiment's dielectric layers have a voltage controlled refractive index. (*See id.; see also* ¶¶0015, 0036, 0038).

2. Taketo discloses a similar apparatus to the prior art examples in Figure 1. The Figure 1 apparatus similarly employs electrodes 21, 22. Taketo's Figure 1 apparatus selectively reflects light colors from three dichroic mirrors 27G, 27R, and 27B. (Taketo ¶¶ 0049-0061). Taketo's Figure 1 embodiment employs less voltage, in a liquid crystal driving means, than the voltage employed in one of the prior art examples. (Taketo ¶¶ 0067, 0072).

3. Nematic liquid crystals having a positive dielectric anisotropy form the light-modulating dielectric layers 23M, 23C and 23Y of Taketo's Figure 1 embodiment. (Taketo ¶¶ 0063, 0064, 0073).

4. Mochizuki discloses an optical switching device employing "any material whose refractive index can be changed by the electro-optical effect" including  $\text{LiNbO}_3$ . (Mochizuki, col. 4, ll. 44-50, *see also* Abstract).

5. Mochizuki also discloses a preferred embodiment using nematic liquid crystal materials that also have the electro-optical effect. Applying voltages to the materials causes the refractive index to change so that incident light reflects or transmits. (Mochizuki, col. 5, l. 10 to col. 6, l. 36).

## PRINCIPLES OF LAW

“[T]here must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). “On appeal to the Board, an applicant can overcome a rejection by showing insufficient evidence of *prima facie* obviousness . . . .” *Kahn*, 441 at 985-6 (Fed. Cir. 2006) (*quoting In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)).

“[W]hen a patent ‘simply arranges old elements with each performing the same function it had been known to perform’ and yields no more than one would expect from such an arrangement, the combination is obvious.” *KSR Int’l Co. v. Teleflex, Inc.*, 127 S.Ct. 1727, 1740 (2007) (*quoting Sakraida v. Ag. Pro. Inc.*, 96 S.Ct. 1532 (1976)). “[W]hen a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.” *Id.* (*citing United States v. Adams*, 86 S.Ct. 708 (1966)).

## ANALYSIS

Taketo’s dielectric layers in the preferred embodiment, shown in Figure 1 and cited by the Examiner (Ans. 3), comprise the same material as Taketo’s prior art examples, nematic liquid crystals having a positive dielectric anisotropy. (FF 1-3). The prior art examples explicitly describe controlling the refractive index with voltage. (FF 1). The preferred embodiment, Figure 1, employs electrodes and the same dielectric material as light modulating layers. (FF 1, 2). Therefore, Taketo’s dielectric layers,

in both the prior art examples and the preferred embodiment, necessarily meet the disputed claim element recited in claim 7: “wherein voltages applied to said electrodes are operable to alter a refractive index of said dielectric material between said electrodes.”

With respect to claim 12, Mochizuki discloses liquid nematic crystals similar to those in Taketo, and also teaches using any dielectric material with a voltage dependent refractive index, including  $\text{LiNbO}_3$ . (FF 3-5). Therefore, substituting one voltage dependent refractive index dielectric material,  $\text{LiNbO}_3$ , for another, a nematic liquid crystal material, amounts to a predictable substitution of prior art elements according to their established functions, *see KSR supra*. Both references teach controlling light passage by applying voltages to dielectric materials to alter the refractive properties thereof. (See FF 1-5). Such a simple substitution of “. . . ‘old elements with each performing the same function it had been known to perform’ and yield[ing] no more than one would expect from such an arrangement, [renders] the combination . . . obvious.” *KSR*, 127 S.Ct. at 1740.

Accordingly, for the reasons discussed above, we sustain the Examiner’s rejection of independent claims 7 and 12, and dependent claims 8, 9, 11, and 13, not separately argued.

## CONCLUSION

Taketo teaches “wherein voltages applied to said electrodes are operable to alter a refractive index of said dielectric material between said electrodes,” as set forth in claim 7. Taketo and Mochizuki collectively teach

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a dielectric material, LiNbO<sub>3</sub>, recited in claim 12. Therefore, we sustain the Examiner's rejection of claims 7-9 and 11-13.

## DECISION

We affirm the Examiner's decision rejecting claims 7-9 and 11-13.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

gvw

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